Reaction Paper

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I. Summary

For the reaction paper, I selected two papers:

- Javarone, Marco Alberto and Wright, Craig Steven. "From Bitcoin to Bitcoin Cash: a network analysis", arXiv preprint arXiv:1804.02350, 2018
- Yan, Bo and Liu, Yiping and Liu, Jiamou and Cai, Yijin and Su, Hongyi and Zheng, Hong. "From the Periphery to the Center: Information Brokerage in an Evolving Network", arXiv preprint arXiv:1805.00751, 2018

The first paper introduces the Bitcoin network analysis and relevant techniques. The second one introduces three aspects of social network theory for evolving networks and uses the Bitcoin OTC trust network as a data set of the evaluation and visualize it.

A. From Bitcoin to Bitcoin Cash: a network analysis

The paper investigates, analyzes and evaluates two types of network: the Bitcoin network and the Bitcoin Cash network, and their 'peer-to-peer' structure. These two directed networks share similar topology with the proof-of-work algorithm. The nodes runs the Bitcoin P2P protocol and play as routers. When a new node joins the network, it connects with a pre-existing one randomly chosen. The generative mechanisms 'fittest-gets-richer' and 'first-mover-wins' model the evolution of the out-degree distribution. And a 'fitness based' model is effective to describe the dynamics of two networks. The evaluation shows us in-degree/out-degree distributions, average clustering coefficients and average shortest path lengthes of two networks. The paper also compares average clustering coefficients with it in an E-R network with the same number of nodes and similar number of edges. The evaluation used three data sets: April 2016 Bitcoin network

with 7025 nodes, August 2017 Bitcoin Cash network with 963 nodes and December 2017 Bitcoin Cash network with 1454 nodes.

The Bitcoin network structure and the analysis in this paper are related to the topic of the course.

B. From the Periphery to the Center: Information Brokerage in an Evolving Network

This paper explores social network theory with three aspects: the center periphery partition, social integration and network dynamics. The paper captures the process in which a newcomer builds ties with an evolving network to gain maximal access of information in the network. Then, over center/periphery networks, the paper proposes three cost-effective tactics: uset-based tactics, rset-based tactics and MUF. Their performance were evaluated on four four data sets: CollegeMsg network, Bitcoin OTC trust network and Cit-HepPh network and Trade network, and on four dynamic center/periphery network models: dynamic BA model, dynamic JR model, dynamic rich-club and dynamic onion.

Social network theory and the center periphery partition in the paper are related to our course topic.

II. Critique

A. From Bitcoin to Bitcoin Cash: a network analysis

Strengths: The paper introduces network structure of Bitcoin and Bitcoin cash and gives us evaluation results of in-degree/out-degree distributions and clustering coefficients.

Weaknesses: The paper should have deeper analyses and investigations of two networks such as the evolution of stochastic processes. Moreover, the paper should evaluate more data sets since three data sets are too few.

B. From the Periphery to the Center: Information Brokerage in an Evolving Network

Strengths: The paper introduces social network theory and several tactics evaluated on some dynamic center/periphery models.

Weaknesses: The tactics should be evaluated on more dynamic network data sets and models.

III. Further work

A. From Bitcoin to Bitcoin Cash: a network analysis

The further analyses, specially for average clustering coefficients, and the investigation evolution of stochastic processes on the Bitcoin networks and the Bitcoin Cash networks are needed.

B. *From the Periphery to the Center: Information Brokerage in an Evolving Network*

The paper remains further works:

- Dynamic models where ties are added as well as severed.
- A distinction exists between the notions of network center and core.
- Dynamic community structure models.
- Network formation game-theoretical models based on the notions of social capital.